

REMARKS

In the Office Action dated September 13, 2010, the Examiner rejects claims 1, 5-10, 12 and 14-16 under 35 U.S.C. §103(a). Claims 2-4, 11 and 13 were previously cancelled. With this Amendment, Applicants have further cancelled claims 8, 12 and 16. Applicants have amended claims 1, 6-7, 9-10 and 14, and have added claims 17 and 18. After entry of this Amendment, claims 1, 5-7, 9-10, 14-15 and 17-18 remain pending in the Application. Reconsideration of the Application as amended is respectfully requested.

Claim Objection

Claim 12 is objected to under 37 CFR 1.75 (c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 12 has been cancelled, rendering the objection moot.

Rejections under 35 U.S.C. §103

Claims 1, 5-10, 12, 14 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kazuo (JP 2000-239738) ("JP '738") in view of Okuda Motoshige (JP 05-017817) ("JP '817") and Saburo et al. (JP 2003-286517) ("JP '517").

Applicants have amended the language of independent claim 1 to more closely correspond to the language of the Applicants' Specification. Specifically, claim 1 now recites the step of applying a repeatedly varying pressure to a vapor film formed when the cooling liquid vaporizes on a surface of the heated metal part by the step of one of 1) applying oscillations to the cooling liquid, 2) changing a pressure to be applied to a liquid surface level of the cooling liquid, and 3) combining of applying oscillations to the cooling liquid and changing the pressure to be applied to the liquid surface level of the cooling liquid. With the exception of the specific further amendments to claim 1 noted below, no substantive change is intended. Support for this amendment can be found in Applicants' Specification at least at paragraphs [0008]-[0010].

Claim 1 has been further amended to remove certain limitations not thought to be pertinent to the patentability of the subject matter recited therein. Accordingly, claim 1 no longer

requires an oscillation device horizontally and reciprocally moving in the cooling liquid and a stirrer separately arranged in the cooling liquid, and no longer requires introduction of a gas above the liquid surface level via a gas introduction pipe. Applicants submit that these limitations are not taught or suggested by the prior art cited by the Examiner, for the reasons set forth in Applicants' Response to Office action mailed March 2, 2010. However, removal of these limitations from claim 1 renders the Examiner's position with respect to these limitations moot.

Applicants have additionally amended claim 1 to more particularly point out and distinctly claim the subject matter recited therein. Specifically, claim 1 now recites that the application of the repeatedly varying pressure causes the vapor film to repeatedly expand and contract to cause a fluctuation in the vapor film, and now includes the step of breaking the vapor film at an initiation point where a thickness of the vapor film has decreased due to the fluctuation in the vapor film. Support for these amendments can be found in the Applicants' Specification at least at paragraph [0009]. Applicants submit that the prior art references cited by the Examiner, either alone or in combination, do not teach or suggest these features of claim 1. For at least this reason, Applicants submit that claim 1 is allowable over the prior art cited by the Examiner.

Applicants have also amended the step of stirring the cooling liquid with a stirrer to make it clear that the stirring is performed only after the vapor film begins to break. As the Examiner acknowledges, JP '738 and JP '817 do not disclose this feature. However, the Examiner asserts that this feature is disclosed by JP '517. Applicants respectfully disagree.

The Examiner appears to assume that the application of a repeatedly varying pressure to break a vapor film, as recited in claim 1, is applied by the vibration stirrer 10 of JP '517. The Examiner then states that the starting time of jet stirrer 20 is controllable, and states further that it would have been obvious to start the time of jet stirring after the vapor film begins to break. However, Applicants submit that the Examiner's analysis is flawed. As reflected in the name "vibration stirrer 10," the liquid coolant 2 in JP '517 is stirred as soon as vibration stirrer 10 operates. The controllability of the starting time of jet stirrer 20 is immaterial because, regardless of the specific sequence of operation between vibration stirrer 10 and jet stirrer 20, the

liquid coolant 2 is always being stirred, albeit by two separate means. Applicants discovered that this was disadvantageous. In this regard, the Applicants respectfully direct the Examiner's attention to paragraphs [0004]-[0006] of the Applicants' Specification, where these shortcomings of JP '517 are explicitly recognized. Further, vibration stirrer 10 does not read on the claimed step of applying of a repeatedly varying pressure to break a vapor film because, as recited in claim 1, this step must occur before any stirring is performed. JP '517 simply does not contemplate breaking the vapor film, either by the vibration stirrer 10 or the jet stirrer 20, before stirring the liquid coolant 2.

In contrast to the teachings of JP '517, which generally discloses that the sequence of operation of two separate stirrers 10 and 20 can be varied, claim 1 requires that the step of applying a repeatedly varying pressure to the vapor film, and the corresponding breaking of the vapor film, occurs before any stirring of the cooling liquid is performed. Because this feature is not disclosed by JP '517, and because the Examiner acknowledges that the deficiencies in JP '517 are not cured by JP '738 and JP '817, Applicants submit that, in addition to the reasons set forth above, claim 1 is allowable over the prior art references cited by the Examiner.

Claim 5 is unchanged, claim 6 is amended to correct a minor typographical error and claim 7 is amended to correct antecedent basis. Applicants submit that claims 5-7 are allowable at least by their dependency from claim 1.

Claim 8 is cancelled without prejudice, rendering the Examiner's rejection moot. Due to the cancellation of claim 8, claim 9 is amended to depend from claim 1, and is further amended for clarity and to correct antecedent basis. Applicants submit that claim 9 is allowable at least by its dependency from claim 1.

Independent claim 10 is amended to correspond to the amendments made to claim 1, discussed above. The comments and arguments made with respect to claim 1 are incorporated herein. Specifically, Applicants submit that the prior art references, either alone or in combination, do not teach or suggest the step of stirring the cooling liquid with a stirrer, wherein the stirring is performed only after the vapor film begins to break. Accordingly, Applicants submit that claim 10 is allowable over the prior art references cited by the Examiner.

Claim 12 has been cancelled, as noted above. Claim 14 is amended for clarity and for antecedent basis, and claim 15 is unchanged. Applicants submit that claims 14-15 are allowable at least by their dependency from claim 10.

Claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kazuo (JP 2000-239738) ("JP '738") in view of Saburo et al. (JP 2003-286517) ("JP '517"). Claim 16 is cancelled without prejudice, rendering the Examiner's rejection moot.

New Claims

Claims 17 and 18 are new. Each depends from claim 1. Claim 17 recites the feature wherein the pressure applied to the vapor film is continuously varied in applying the oscillations to the cooling liquid. Support for this feature can be found in Applicants' Specification at least at paragraph [0010]. Claim 18 recites the feature wherein the pressure applied to the vapor film is intermittently varied in applying the oscillations to the cooling liquid. Support for this feature can be found in Applicants' Specification at least at paragraph [0010]. Applicants submit that the prior art references cited by the Examiner, either alone or in combination, do not teach or suggest these features of claims 17 and 18. Applicants submit that claims 17 and 18 are allowable for this reason, as well as based upon their dependency from claim 1.

Conclusion

It is submitted that this Amendment has antecedent basis in the Application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the Application as amended is requested. It is respectfully submitted that this Amendment places the Application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present Application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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A handwritten signature in cursive script, appearing to read "Francine Nesti".

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